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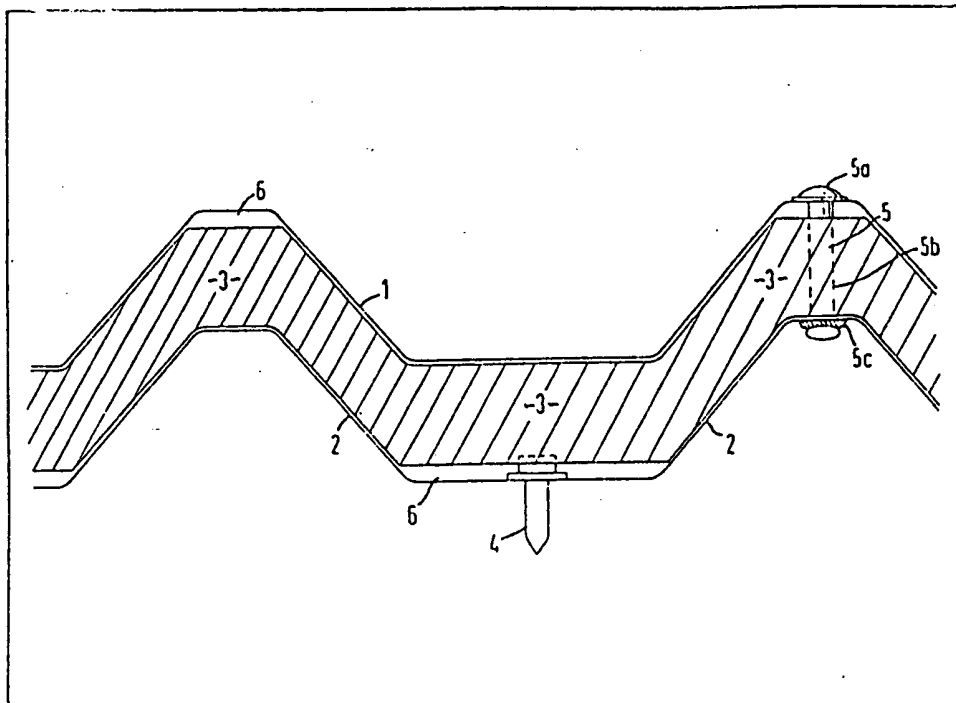
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(54) Double-skin Wall or Roof Panel

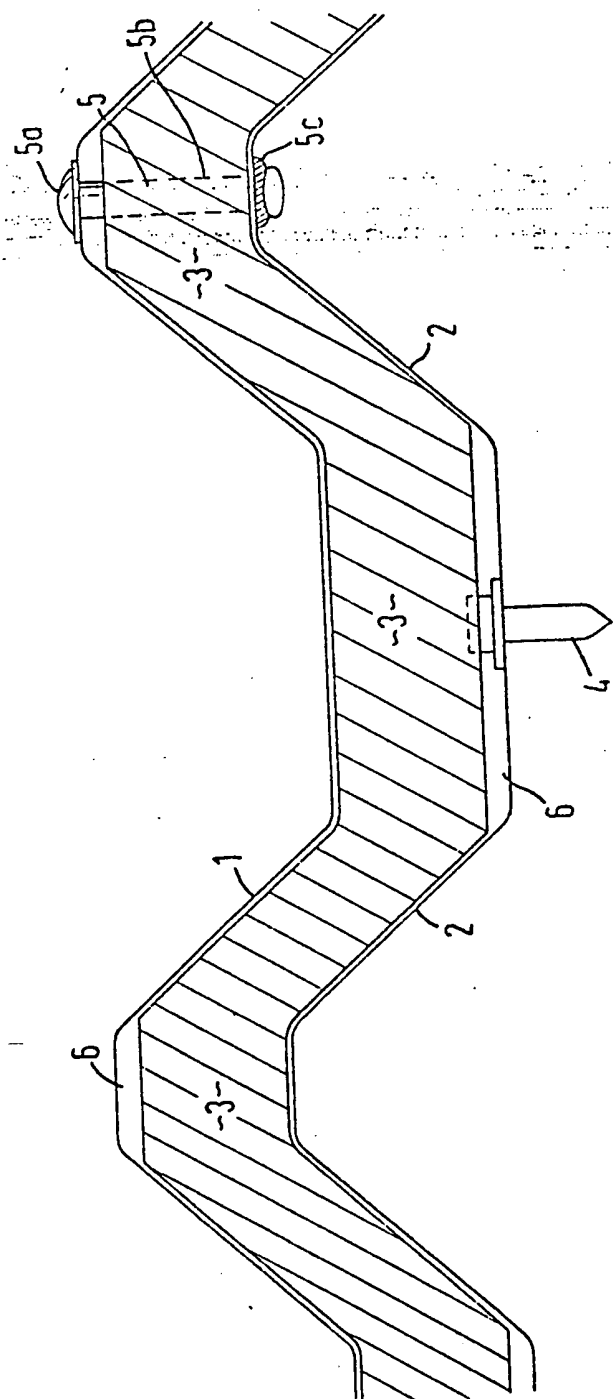
(57) The panel has inner and outer
skins (1) and (2) having between them
a substantially incompressible,

preformed thermally insulating
material (3). Skins 1 and 2 are of
corrugated or castellated sheet, and
material 3 is shaped so that it fits into
the corrugations or castellations.
Ventilation channels (6) may be
provided between the insulation and
the skin to reduce internal
condensation. The sheet may be
metal, asbestos cement, or plastics.
The insulating material may be foam
plastics, asbestos, or a mineral fibre or
particle board.



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SPECIFICATION

Improvements in or Relating to Double-skin Wall or Roof Panels

5 This invention relates to roof or wall panels having a double skin, and a layer of insulating material between the two skins.

10 It is well-known that double-skin walls with insulation between the skins can form an effective heat-flow barrier. The simplest form of such walls has two impervious skins with an air-gap between them, as in the familiar cavity wall. However, it is also known to insert flat sheets of insulation material between inner and outer skins of a wall or roof. Such insulation may be composed, for
15 example, of fibreglass matting, polyurethane foam, or polystyrene. One of the problems encountered when such material is sandwiched between substantially flat metal plates is one of condensation of moisture, since it is very difficult to keep moist air out of the space between the
20 skins and the outer skin will normally be appreciably colder than the inner one, so that moisture tends to condense on the inner surface of the outer skin and soak into the insulation material.

25 Where the inner and outer skins are of corrugated (or castellated, i.e. flat-topped) sheet-metal, asbestos cement, or plastics material, then there is the additional problem of locating the insulating material so that it is not squashed between opposing ridges of the corrugated sheet
30 metal or plastics.

35 We have now devised a double-skin roof or wall panel for a sheet-metal, asbestos cement, or plastics clad building which substantially ameliorates the shortcomings referred to above.

40 The invention consists of a double skin roof or wall panel for a building comprising inner and outer skins each formed of corrugated or castellated sheet and a substantially incompressible insulation material interposed between the inner and outer skins and shaped so that projecting ribs on the insulating material fit into the corrugations or castellations of the sheet
45 material forming the skins.

50 Preferably the ribs on the insulating material are spaced from troughs of the corrugated or castellated sheet to form continuous ventilation channels extending longitudinally with the corrugations or castellations. In this way, condensation is substantially reduced due to the ventilating effect of these air channels.

55 The ribs may each be formed to provide a ventilation channel extending along the base of each corrugation or castellation.

60 Preferably each corrugation or castellation formed on the outer skin is aligned with a corrugation or castellation formed on the inner skin.

65 The inner and outer skins may be retained by compressive fixing means, for example by bolts or rivets passing through aligned corrugations or castellations of the inner and outer skins.

Preferably the insulation material is preformed

65 to correspond to the internal profiles of the inner and outer skins.

Preferably the corrugations (or castellations) of the sheet material run up and down the roof pitch, or vertically up and down side-walls.

70 Preferably the profiled insulation material is composed of rigid or semi-rigid polyurethane, isocyanurate or polystyrene foam. Alternatively, it may be shaped asbestos, or other mineral fibre or particle boards or slabs.

75 The corrugated or castellated sheet materials may be composed of metal, asbestos cement or plastics material.

80 In this way it is possible to provide double-skin insulating cladding panels for the pitched roof or wall of a sheet-clad building, these having the ability to reduce condensation, and to drain away condensed moisture collecting between the two skins.

85 Whilst such a panel can be fixed through a trough of an inner sheet into a purlin or sheeting rail forming the roof skeleton, an additional feature is the ability to provide a secondary fixing system based upon the joining of the outer sheet, through the insulation layer, into the inner. By
90 means of a fastener incorporating a deformable inner washer, this secondary fixing avoids the compression problems inherent in such fixings which are normally located in the purlin or sheeting rail.

95 The invention will be further described with reference to the accompanying single figure of diagrammatic drawing which shows a cross-section through a double-skin roof or wall panel according to the invention.

100 With reference to the figure, outer and inner skins of castellated sheet material, preferably of coated steel, are indicated at 1 and 2 respectively. A profiled insulation material is indicated as 3. A fastener for fixing inner sheet 2 to a roof purlin or
105 sheeting-rail is indicated at 4 and a secondary fastener for holding the insulating material in place and for joining the inner and outer skins together, passing through the insulation material is indicated at 5.

110 A roof structure incorporating a double-skin panel according to the invention is assembled as follows:

115 The inner skin of castellated sheet metal 2 is attached to an underlying purlin or sheeting-rail by means of fastener 4. The profiled pre-formed insulation material indicated at 3, is then placed on top of the inner skin so that ribs or projections of the insulating material fit into troughs or valleys of the castellated sheet 2 as shown. However the insulation material does not entirely fill such
120 troughs or valleys and air gaps (indicated at 6) are left between the insulation material and the sheet material. These air gaps run, as channels, along the length of the castellation trough or valley. The outer skin 1 is then placed on top of the insulation material 3 and holes are drilled through the "sandwich" formed by 1, 2 and 3 to take the
125 fastener 5. Fastener 5 has a head 5a, a shank 5b and a deformable washer 5c which ensures some

flexibility when the sandwich elements are clamped together by means of the fastener.

Claims

1. A double skin roof or wall panel for a building comprising inner and outer skins each formed of corrugated or castellated sheet and a substantially incompressible insulation material interposed between the inner and outer skins and shaped so that projecting ribs on the insulating material fit into the corrugations or castellations of the sheet material forming the skins.
2. A panel as claimed in Claim 1 wherein the ribs on the insulation material are spaced from troughs of the corrugated or castellated sheet to form continuous ventilation channels extending longitudinally with the corrugations or castellations.
3. A panel as claimed in Claim 2 wherein the ribs are each formed to provide a ventilation channel extending along the base of each corrugation or castellation.
4. A panel as claimed in any preceding Claim wherein each corrugation or castellation formed on the outer skin is aligned with a corrugation or castellation formed on the inner skin.
5. A panel as claimed in Claim 4 wherein the inner and outer skins are retained by compressive fixing means passing through aligned corrugations or castellations of the inner and outer skins to urge the skins into contact with the insulation material.
6. A panel as claimed in any preceding Claim in which the insulation material is preformed to correspond to the internal profiles of the inner and outer skins.
7. A panel according to any preceding Claim in which the insulation material consists of rigid or semi-rigid polyurethane, isocyanurate, polystyrene foam asbestos, or a mineral fibre or particle board.

8. A panel according to any preceding Claim in which the corrugated or castellated sheet material consists of metal, asbestos cement or plastics.

9. A building or structure when including in its construction a panel as claimed in any preceding Claim.

10. A building or structure as claimed in Claim 9 wherein the corrugations or castellations of the skin run up and down the roof pitch or vertically up and down the sidewalls.

11. A roof or wall panel substantially as described with reference to the accompanying drawing.

- New Claims or Amendments to Claims filed on 27 March 1980.
Superseded Claim 6.

New or Amended Claims:—

1. A double skin roof or wall panel for a building comprising inner and outer skins each formed of corrugated or castellated sheet material and a substantially incompressible pre-formed insulation material interposed between the inner and outer skins and shaped so that projecting ribs on the insulating material fit into the corrugations or castellations of the sheet material forming the skins.
11. A method of roofing a building, comprising attaching an inner skin of corrugated or castellated sheet material to underlying purlins or sheeting-rails, placing a pre-formed sheet of substantially-incompressible insulation material on top of said inner skin so that ribs of the insulation material fit into troughs of the sheet material, superimposing an outer skin or corrugated or castellated sheet material on the insulation material so that ribs of the insulation material fit into troughs of the outer skin and fastening all three layers together.